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10/552,728	10/11/2005	Koso Fujino	017700-0179	9461

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EXAMINER	
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1735	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/552,728	FUJINO ET AL.	
	Examiner	Art Unit	
	PAUL A. WARTALOWICZ	1735	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,9 and 15-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3,9 and 15-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 3, 9, 15-27 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 26 and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 26 and 27 recite “comprises hydrogen and argon gas being at least 1 mol% concentration” and “comprises hydrogen and argon gas being at least 1 mol% concentration” does not appear to have support in the specification. Specifically, it appears that these claim limitations recite that argon, or both argon and hydrogen, is present in an amount of at least 1 mol% concentration (claim 26) or at least 3 mol% concentration (claim 27). However, it appears that applicant's specification supports a recitation of hydrogen being present in a reductive gas in amount of at least 1 mol%, or at least 3 mol% (See applicant’s specification at page 10, lines 15-22).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in claim 23 of "a corrosive acidic or basic liquid" renders the claim indefinite. Does corrosive modify just the acidic liquid or both the acidic and basic liquids? Clarification is requested. The limitation will be interpreted as corrosive modifying the liquid, whether it is acidic or basic.

The recitation in claims 26 and 27 which recite "comprises hydrogen and argon gas being at least 1 mol% concentration" and "comprises hydrogen and argon gas being at least 1 mol% concentration" render the claims indefinite. It is unclear whether the mole concentration is referring to argon, or both argon and hydrogen as "being at least…" is a dangling modifier. Therefore, the metes and bounds of the claims are unclear.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3, 9, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foltyn (US 2005/0019616) in view of Kreiskott ("Continuous electropolishing of Hastelloy…"), JP 07-105750 (hereinafter '750: please refer to the machine translation attached to this office action), Hsu (US 6569745), and Christen (US 6296701).

Foltyn teaches a method of producing a superconducting wire [0012] comprising polishing (planarizing) a nickel substrate by chemical mechanical polishing (which appears to satisfy the claimed chemical polishing and/or mechanochemistry [0013, 0022]), after the polishing step an intermediate layer is deposited on the substrate [0016], after which a layer of YBCO is deposited thereon [0027].

Regarding claims 3 and 9; Foltyn fails to teach that the substrate is polished to a surface roughness F_{P-V} of at most 150 nm.

Kreiskott, however, teaches a method of making a superconductor wherein a nickel substrate is polished to a surfaces roughness (Ra) of approximately 20 nm (page 614, second column) for the purpose of providing a suitable surface for deposition of subsequent layers (page 616, first column).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the nickel substrate of Foltyn polished to a surfaces roughness (Ra) of approximately 20 nm (page 614, second column) in order to provide a suitable surface for deposition of subsequent layers (page 616, first column).

Regarding claims 3, 9, 15-18; Foltyn fails to teach that the polishing provides a surface layer with a crystal axis offset relative to an orientation axis by at most 25°.

'750 teaches a superconductor wire [0001] wherein the angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) for the purpose of reducing micro unevenness of the grain boundary [0023].

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a substrate having an angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) in Foltyn in order to reduce micro unevenness of the grain boundary [0023] as taught by '750.

It appears that the angles disclosed in '750, namely that the angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) overlaps with and inherently meets the limitation of crystal axis offset relative to an orientation axis by at most 10°.

If '750 does not inherently teach a crystal axis offset relative to an orientation axis by at most 10°, it would be obvious to reduce the crystal axis offset relative to an orientation axis to overlap with a range of at most 10° because '750 teaches that reducing micro unevenness of the grain boundary is desired for superconductor properties [0023].

Regarding claims 3 and 9, Foltyn fails to teach that the substrate is polished to a depth of 300 nm.

Hsu teaches a method of making a superconducting article (col. 1) wherein it is known to planarize a layer to a thickness of between 50-500 nm (col. 2).

Therefore, it would have been obvious to one of ordinary skill in the art to planarize a layer to a thickness of between 50-500 nm (col. 2) in Foltyn in order to produce a superconducting article as taught by Hsu.

Regarding claims 3, 9, 19, and 20; Foltyn fails to teach thermally treating said textured metal substrate at a temperature of 500-800°C, more preferably 600-700°C, in either a vacuumed or reduced atmosphere at least once.

Christen, however, teaches a method of making biaxial substrates for superconductors (col. 1, lines 14-18) wherein a nickel substrate is annealed in a vacuum atmosphere, or reducing atmosphere, at a temperature of 600-900°C for 5 hours for the purpose of removing metallic oxides and other impurities (col. 8, lines 16-30).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide annealing the nickel substrate of Foltyn

in a vacuum atmosphere, or reducing atmosphere, at a temperature of 600-900℃ for 5 hours in order to remove metallic oxides and other impurities (col. 8, lines 16-30) as taught by Christen.

Regarding claims 19 and 20, it appears that the range of annealing temperature disclosed by Christen overlaps with that of claims 19 and 20. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Regarding claim 21, Christen teaches that the atmosphere for cleaning is a vacuumed atmosphere (col. 8, lines 20-25). The range of pressure of less than 1 atm (equivalent to $1.01 * 10^5$ Pa) taught by Christen overlaps with the claimed range of less than $1.33 * 10^{-2}$Pa. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Regarding claim 22, Christen teaches annealing for 5 hours (col. 8, lines 16-30).

Claims 3, 9, 15-20, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foltyn (US 2005/0019616) in view of Kreiskott ("Continuous electropolishing of Hastelloy…"), JP 07-105750 (hereinafter '750: please refer to the machine translation attached to this office action), Hsu (US 6569745), and Truchan (US 6455166).

Foltyn teaches a method of producing a superconducting wire [0012] comprising polishing (planarizing) a nickel substrate by chemical mechanical polishing ([0013,

0022]), after the polishing step an intermediate layer is deposited on the substrate [0016], after which a layer of YBCO is deposited thereon [0027].

Regarding claims 3 and 9; Foltyn fails to teach that the substrate is polished to a surface roughness F_{P-V} of at most 150 nm.

Kreiskott, however, teaches a method of making a superconductor wherein a nickel substrate is polished to a surfaces roughness (Ra) of approximately 20 nm (page 614, second column) for the purpose of providing a suitable surface for deposition of subsequent layers (page 616, first column).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the nickel substrate of Foltyn polished to a surfaces roughness (Ra) of approximately 20 nm (page 614, second column) in order to provide a suitable surface for deposition of subsequent layers (page 616, first column).

Regarding claims 3, 9, 15-18; Foltyn fails to teach that the polishing provides a surface layer with a crystal axis offset relative to an orientation axis by at most 25°.

'750 teaches a superconductor wire [0001] wherein the angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) for the purpose of reducing micro unevenness of the grain boundary [0023].

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a substrate having an angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is

less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) in Foltyn in order to reduce micro unevenness of the grain boundary [0023] as taught by '750.

It appears that the angles disclosed in '750, namely that the angle Φ (made by the normal X of the crystal surface and the Y of the polycrystalline metal base body) is less than 15° and angle θ formed by connecting crystal particles is less than 10° (Abstract, [0023]) overlaps with and inherently meets the limitation of crystal axis offset relative to an orientation axis by at most 10°.

If '750 does not inherently teach a crystal axis offset relative to an orientation axis by at most 10°, it would be obvious to reduce the crystal axis offset relative to an orientation axis to overlap with a range of at most 10° because '750 teaches that reducing micro unevenness of the grain boundary is desired for superconductor properties [0023].

Regarding claims 3 and 9, Foltyn fails to teach that the substrate is polished to a depth of 300 nm.

Hsu teaches a method of making a superconducting article (col. 1) wherein it is known to planarize a layer to a thickness of between 50-500 nm (col. 2).

Therefore, it would have been obvious to one of ordinary skill in the art to planarize a layer to a thickness of between 50-500 nm (col. 2) in Foltyn in order to produce a superconducting article as taught by Hsu.

Regarding claims 3, 9, 19, and 20; Foltyn fails to teach thermally treating said textured metal substrate at a temperature of 500-800°C, more preferably 600-700°C, in either a vacuumed or reduced atmosphere at least once.

Truchan, however, teaches a method of making superconductors (col. 1, lines 10-20) wherein a metal substrate is annealed at a temperature of 400-1000°C in a reducing atmosphere of 95% argon and 4 % hydrogen for the purpose of producing a cube texture in the substrate (col. 6, lines 5-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the metal substrate of Foltyn annealed at a temperature of 400-1000°C in a reducing atmosphere of 96% argon and 4 % hydrogen in order to produce a cube texture in the substrate (col. 6, lines 5-15) as taught by Truchan.

Regarding claims 19 and 20, it appears that the range of annealing temperature disclosed by Truchan overlaps with that of claims 19 and 20. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. MPEP 2144.05 (I).

Regarding claims 26 and 27, it appears that the mixture of 96% argon and 4 % hydrogen overlaps with the claimed limitation of a hydrogen gas mixture comprises hydrogen and argon being at least 1 mol%, or at least 3 mol%, concentration. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. MPEP 2144.05 (I).

Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foltyn (US 2005/0019616) in view of Kreiskott ("Continuous electropolishing of Hastelloy…"), JP 07-105750 (hereinafter '750: please refer to the machine translation attached to this office action), Hsu (US 6569745), and Christen (US 6296701) in further view of Rostoker (US 5389194).

Foltyn, Kreiskott, '750, Hsu, and Christen teach a method as described above in claims 3, but fail to teach that the mechanochemistry includes applying a polishing slurry that comprises a corrosive basic liquid.

Regarding claims 23 and 25; Foltyn, however, teaches that the metal substrate is polished by chemical mechanical polishing (chemical mechanical polishing appears to be substantially similar to mechanochemical polishing, [0013, 0022]), but fails to teach that the chemical mechanical polishing includes applying a polishing slurry that comprises a corrosive basic liquid and SiO_2 (silica).

Rostoker teaches a method of polishing substrates (col. 1, lines 10-20) wherein chemical mechanical polishing includes rubbing a surface to be polished with a slurry including potassium hydroxide and silica (potassium hydroxide is a corrosive basic liquid, col. 1, lines 40-50).

As Foltyn teaches that the metal substrate is polished by chemical mechanical polishing ([0013, 0022]) and Rostoker teaches that chemical mechanical polishing includes rubbing a surface to be polished with a slurry including potassium hydroxide and silica (potassium hydroxide is a corrosive basic liquid, col. 1, lines 40-50), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was

made to use a slurry including potassium hydroxide and silica in the chemical mechanical polishing of Foltyn, Kreiskott, '750, Hsu, and Christen.

Regarding claim 24, Rostoker teaches that it is known to polish a surface by applying a slurry with a rotating pad to the surface to be polished (col. 1, lines 53-64). While this passage in Rostoker discusses the complete polishing of a layer (i.e. removal of the layer), it appears that one of ordinary skill in the art would be able to use the rotating pads of Rostoker to partially remove a layer (i.e. partially polish) using rotating pads by adjusting variables such as polishing time, polishing pressure, etc. in the chemical mechanical polishing process of Foltyn, Kreiskott, '750, Hsu, and Christen absent a showing of unexpected results.

Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foltyn (US 2005/0019616) in view of Kreiskott ("Continuous electropolishing of Hastelloy…"), JP 07-105750 (hereinafter '750: please refer to the machine translation attached to this office action), Hsu (US 6569745), and Truchan (US 6455166) in further view of Rostoker (US 5389194).

Foltyn, Kreiskott, '750, Hsu, and Truchan teach a method as described above in claims 3, but fail to teach that the mechanochemistry includes applying a polishing slurry that comprises a corrosive basic liquid.

Regarding claims 23 and 25; Foltyn, however, teaches that the metal substrate is polished by chemical mechanical polishing ([0013, 0022]), but fails to teach that the

chemical mechanical polishing includes applying a polishing slurry that comprises a corrosive basic liquid and SiO_2 (silica).

Rostoker teaches a method of polishing substrates (col. 1, lines 10-20) wherein chemical mechanical polishing includes rubbing a surface to be polished with a slurry including potassium hydroxide and silica (potassium hydroxide is a corrosive basic liquid, col. 1, lines 40-50).

As Foltyn teaches that the metal substrate is polished by chemical mechanical polishing (chemical mechanical polishing appears to be substantially similar to mechanochemical polishing, [0013, 0022]) and Rostoker teaches that chemical mechanical polishing includes rubbing a surface to be polished with a slurry including potassium hydroxide and silica (potassium hydroxide is a corrosive basic liquid, col. 1, lines 40-50), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to use a slurry including potassium hydroxide and silica in the chemical mechanical polishing of Foltyn, Kreiskott, '750, Hsu, and Truchan.

Regarding claim 24, Rostoker teaches that it is known to polish a surface by applying a slurry with a rotating pad to the surface to be polished (col. 1, lines 53-64). While this passage in Rostoker discusses the complete polishing of a layer (i.e. removal of the layer), it appears that one of ordinary skill in the art would be able to use the rotating pads of Rostoker to partially remove a layer (i.e. partially polish) using rotating pads by adjusting variables such as polishing time, polishing pressure, etc. in the chemical mechanical polishing process of Foltyn, Kreiskott, '750, Hsu, and Truchan absent a showing of unexpected results.

Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foltyn (US 2005/0019616) in view of JP 07-105750 (hereinafter '750: please refer to the machine translation attached to this office action), Hsu (US 6569745), Kreiskott ("Continuous electropolishing of Hastelloy…"), and Christen (US 6296701) in further view of Truchan (US 6455166).

Foltyn, Kreiskott, '750, Hsu, and Christen teach a method as described above in claims 3, but fail to teach that the hydrogen gas mixture comprises hydrogen and argon being at least 1 mol%, or at least 3 mol%, concentration.

Truchan, however, teaches a method of making superconductors (col. 1, lines 10-20) wherein a metal substrate is annealed in a reducing atmosphere of 95% argon and 4 % hydrogen for the purpose of producing a cube texture in the substrate (col. 6, lines 5-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the metal substrate of Foltyn, Kreiskott, '750, Hsu, and Christen annealed in a reducing atmosphere of 96% argon and 4 % hydrogen in order to produce a cube texture in the substrate (col. 6, lines 5-15) as taught by Truchan.

Additionally, it appears that the mixture of 96% argon and 4 % hydrogen overlaps with the claimed limitation of a hydrogen gas mixture comprises hydrogen and argon being at least 1 mol%, or at least 3 mol%, concentration. In the case where the claimed

ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul A Wartalowicz/
Examiner, Art Unit 1735

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1735